



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI  
GOVERNOR

MEMORANDUM

DAVID P. LITTELL  
COMMISSIONER

TO: Board of Environmental Protection  
FROM: Michael Mullen, Bureau of Land & Water Quality, Augusta  
DATE: October 1, 2009  
RE: Amendment of *Permit by Rule Standards*, 06-096 CMR 305: post to public hearing

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Statutory and Regulatory Reference: Amendments are proposed to Chapter 305 Section 10 Stream crossings pursuant to general statutory authority at 38 M.R.S.A. §341-D(1-B). Chapter 305 is adopted pursuant to the *Natural Resources Protection Act* (NRPA), 38 M.R.S.A. §§480-A-480-FF. In addition, P. L. 2009 Chapter 460 directed the Department to amend the stream crossing standards of this chapter, and made the amendments major substantive.

Scope/Description: P. L. 2009 Chapter 460, a copy of which is attached, modified exemptions in the Natural Resources Protection Act relating to the maintenance and repair of stream crossings and the replacement of culverts. These exempt activities are now required to allow for passage of fish and "other aquatic organisms" and "achieve natural stream flow". In addition, the law required that the Department modify Chapter 305 Permit by Rule Standards (PBR) to require municipalities to achieve natural stream flow when repairing or maintaining stream crossings. The law and rule amendments are to apply only to "water courses containing fish". Forest management activities are exempt from the provision of Chapter 460.

There is a documented concern that many older crossings block fish passage, that certain maintenance activities such as slip-lining further restrict fish passage and that replaced culverts are not necessarily done such that fish passage is actually achieved. The new language in Chapter 460 is designed to ensure that maintenance and repair of stream crossings restores and improves stream hydrology and habitat connectivity.

There are a number of issues with the wording of Chapter 460 that will be discussed at the time any provisionally adopted rules are brought back to the Legislature. First, although Chapter 460 required the department to amend PBR to require municipalities to achieve natural stream flow when they repair or maintain stream crossings, most repair and maintenance of stream crossings comes under a statutory exemption so PBR doesn't apply. Also, the crossing provisions in our current PBR rules aren't written to apply only to municipalities. Our decision is to propose draft rule amendments that apply to everyone, and use the "natural stream flow" standard for new crossings and repair/maintenance activities that are not covered by the statutory exemption.

The recent statutory amendments in Chapter 460 added language to the exemptions for maintenance and repair of stream crossings to require the passage of not only fish but also "other aquatic organisms". Text was also added limiting the exemption to watercourses containing fish, which seems inconsistent. Discussions with fisheries biologist indicate that fish may occupy some portion of any stream. Therefore, for purposes of this rule, the department is proposing to define "watercourse containing fish" to mean the same as "river, stream or brook".

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The proposed amendments include allowing certain types of maintenance and repair activities to proceed under the PBR process, and include new submission requirements, standards and definitions related to stream crossings.

**Definitions:** New definitions have been added for bankfull depth and width. The existing definition of cross sectional area has been modified to use these measurements rather than those obtained from the normal high water line. Definitions of “natural stream flow” and “water courses containing fish” have been added for the purpose of interpreting the statute and to support the rule standards.

**Standards:** New crossings will be required to use structures of a width that is 1.2 times the bankfull width. Structures with bottoms, such as culverts, box culverts and pipe arches, will have to be set below the stream bed elevation such that they meet this requirement at the bankfull width elevation. Structures with bottoms will be required to have corrugations or other internal roughness: smooth-bore culverts will not be allowed. In some cases, such as on wider streams or where ledge is present, applicants will need to use open bottom structures such as bridges or open arches.

**Submissions:** Applicants will be required to submit a signoff from both the Departments of Inland Fisheries and Wildlife and Marine Resources for certain repair/maintenance activities, and where certain standards are not to be met due to an existing fish passage barrier or where the spread of invasive species is undesirable. Drawings that depict the stream, its cross sectional area and the crossing structure to be used will also be required.

**Environmental issues:** Current rule standards for new stream crossings allow for crossing structures such as culverts to be placed in a stream channel and actually constrict its flow. This can increase flow velocity through the structure and impede passage for fish and other aquatic organisms. It can also change the ability of the stream to pass bedload and lead to scouring above and below the culvert. Current thinking by experts across the country is that stream ecology and morphology can be better maintained by using crossing structures that more than span the stream’s width and by being embedded fully below the stream bed. This allows for the crossing structure, such as a culvert, to fill with bedload materials and act like the natural stream at normal flows. This reduces the physical effects both up and down stream of the crossing caused by constricting or confining flows in structures.

In addition, experts use the concept of bankfull depth and width as more appropriate dimensional features of a stream to be used when sizing a crossing structure. Currently, stream crossing sizing is based on the normal high water line which is often located below the top of a stream’s bank. However, streams routinely fill their banks in 1.5 to 2.0 year frequency storms and it is these flow periods that are the primary channel-forming flows. Sizing structures based on the bankfull concept will require larger structures but they should accommodate the more severe and frequent storms we have been experiencing and are expected to continue to experience into the future.

The new rules will require that new crossings be sized based on a stream's cross sectional area using bankfull width and depth. New and replaced crossing structures will be required to be of a width that is 1.2 times the bankfull width and be embedded in the stream. While provisions are included in the rule to allow for some new or maintained crossings to not meet certain standards, the new rules should reduce the negative effects of crossings on stream hydrology, morphology and ecology.

Department Recommendation: The department recommends that the Board post the proposed amendments to Chapter 305 Section 10 Stream crossings to a public hearing. High interest in this rulemaking is expected because maintenance and repair of existing crossings and new crossings will be required to use larger and wider structures in most cases, which can lead to significantly higher costs in some cases.

Recommended public hearing date: November 5, 2009.

Estimated Time of Presentation: Approximately 30 minutes.

**DRAFT AMENDMENTS**  
**CHAPTER 305 PERMIT BY RULE STANDARDS**  
**October 1, 2009**

**10. Stream crossings (bridges, culverts and fords)**

**A. Applicability**

- (1) This section applies to the construction of a ~~bridge span or culvert~~ crossing of a river, stream or brook, and associated ~~accessway~~ construction within 25 feet of the river, stream or brook crossing excluding the following:
- (a) Crossings of outstanding river segments identified in 38 M.R.S.A. Section 480-P;
  - (b) Crossings of any river as defined by 38 M.R.S.A. Section 436-A(11), the Mandatory Shoreland Zoning Act (information is available at the Town Office);  
or
  - (c) Crossings of any portion of a river, stream or brook that experiences tidal action.

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NOTE: Temporary structures do not require a permit from the department under the Natural Resources Protection Act (NRPA) provided no filling and minimal soil disturbance occurs. All crossings involving filling in and adjacent to a river, stream or brook, such as culvert crossings, are subject to the NRPA and must first receive a permit before construction.

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- (2) This section also applies to the maintenance, repair or replacement of culverts that use a smooth-bore culvert or that result in a smaller diameter culvert than the original culvert being maintained, repaired or replaced.
- (~~23~~) This section also applies to the establishment of a permanent stream ford for purposes of timber harvesting, livestock, agriculture and construction and maintenance of a utility line.
- (~~34~~) A stream crossing constructed between July 15 and October 1 that is associated with forest management activities is exempt from the 14 day waiting period required in Section 1(C)(1).
- (~~45~~) A stream crossing constructed between July 15 and October 1 that is performed or supervised by individuals currently certified in erosion control practices by the DEP is exempt from the 14 day waiting period required in Section 1(C)(1).
- (~~56~~) Multiple stream crossings may be submitted on one PBR notification form as long as all of the crossing activities are located within one town.
- (~~67~~) This section does not apply to an activity that is not or will not be in compliance with the terms and conditions of permits issued under the Site Location of Development Law, 38 M.R.S.A. Sections 481 to 490, the Storm Water Management

Law, 38 M.R.S.A. Section 420-D, or the Natural Resources Protection Act, 38 M.R.S.A. Sections 480-A to 480-Z.

- (78) This section does not apply to an activity that will not conform to the local shoreland zoning ordinance.

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NOTES:

- (1) Contact the local Code Enforcement Officer for information on local shoreland zoning requirements.
- (2) Maintenance and repair of a public or private crossing of a river, stream or brook is exempt from the NRPA (see 38 M.R.S.A. §480-Q(2) and (2-A)) provided that:
  - (a) Erosion control measures are taken to prevent sedimentation of the water;
  - (b) The crossing does not block fish-passage for fish or other aquatic organisms in the water course. Culverts and installation techniques utilized must achieve natural stream flow; and
  - (c) Any replaced culvert is not more than 25% longer than the culvert being replaced and is not longer than 75 feet.
- (3) A permit will be required from the US Army Corps of Engineers for the following types of projects:
  - (a) Any activity involving impacts (direct and secondary) to freshwater wetlands; or
  - (b) An activity within a river, stream or brook between October 2 and July 14.
  - (c) An activity within a river, stream or brook that has been designated critical habitat for federally endangered Atlantic salmon. Waterways listed as critical habitat may be found at [http://www.nero.noaa.gov/prot\\_res/altsalmon/dpsmaps.html](http://www.nero.noaa.gov/prot_res/altsalmon/dpsmaps.html). Applicants should be advised that applications for work in these waters may require the Corps of Engineers to consult with federal resource agencies pursuant to the Endangered Species Act and that no work may proceed until consultation has been completed and written approval from the Corps has been received.

A copy of the PBR notification form, plans, and original photographs, not photocopies, should be submitted to the Corps of Engineers for these activities (US Army Corps of Engineers, 675 Western Avenue, Suite #3, Manchester, ME 04351. Tel. (207) 623-8367). Applicants should also furnish the Corps with the additional information outlined in the Corps of Engineers Information Bulletin. PBR ACTIVITIES THAT REQUIRE A CORPS PERMIT MAY NOT BEGIN CONSTRUCTION UNTIL WRITTEN APPROVAL FROM THE CORPS IS RECEIVED.

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**B. Submissions**

- (1) For any crossing involving trenching or disturbance of substrate in a river, stream or brook that occurs between October 2 and July 14, the proposed dates for construction of the crossing must be clearly identified on the notification form under "Description of Project".
- (2) Except for crossings associated with forest management activities, the applicant is required to submit photographs of the areas immediately upstream and downstream of the crossing location ~~that will be affected by the activity proposed.~~
- (3) Photographs showing the completed project and the affected area must be submitted within 20 days of the activity's completion. The photographs must be sent with a copy of the notification form or labeled with the applicant's name and the town in which the activity took place.
- (4) Except for crossings associated with forest management activities, approval from the Department of Inland Fisheries and Wildlife (DIFW) and the Department of Marine Resources (DMR) must be submitted to the DEP with the notification form for a waiver of certain Section C standards for any of the following activities:
  - a. Culvert maintenance, repair or replacement activities that use a smooth-bore culvert or that result in a smaller diameter culvert than the original culvert being maintained, repaired or replaced (Standards C(5), (6), (11c) and (11d));
  - b. Any crossing involving trenching or disturbance of substrate in a river, stream or brook that occurs between October 2 and July 14 (Standard C(15));
  - c. Any crossing that will not allow for the passage of fish and other aquatic organisms for the purpose of preventing the expansion of the range of an invasive fauna species (Standard C(11c); or
  - d. Any crossing where the presence of existing ledge prevents embedding of the crossing structure and the ledge condition is deemed a barrier to fish passage (Standards C(11c) and (12)).
- (5) Except for crossings associated with forest management activities, scaled drawings showing a cross-section of the stream to be crossed and the crossing structure to be used. The drawing of the stream cross-section must show the bankfull width and calculations indicating the cross-sectional area of the stream at bankfull depth. The drawing of the crossing structure must indicate the structure to be used, width, length and height of the structure, and the cross-sectional area of the structure available for stream flow, discounting any portions of the structure embedded in the stream channel.

It is not necessary to have the plan professionally prepared. However, it must be legible and drawn to a scale that provides a clear representation of distances and measurements on the plan.



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NOTE: Guidance and informational material on determining bankfull width and depth, stream cross sectional area, and crossing structure cross sectional area is available from the DEP.

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### C. Standards

- (1) The following measures must be taken to prevent erosion of soil or fill material from disturbed areas into the resource:
  - (a) Staked hay bales, ~~or silt fence or other suitable erosion control material~~ must be properly installed between the area of soil disturbance and the resource before the activity begins;
  - (b) All erosion control~~Hay bales or silt fence~~ barriers must be maintained until the disturbed area is permanently stabilized;
  - (c) Within 7 calendar days following the completion of any soil disturbance, and prior to any storm event, mulch must be spread on any exposed soils;
  - (d) All disturbed soils must be permanently stabilized; and
  - (e) Within 30 days of final stabilization of the site, any silt fence must be removed.

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NOTE: For guidance on erosion and sedimentation controls, consult the Maine Erosion and Sediment Control BMPs, dated March 2003. This handbook and other references are available from the DEP.

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- (2) If a perennial watercourse to be crossed is used for navigation, the crossing must consist of a bridge span or other open bottom structure~~pipe arch~~ with at least 4 feet of clearance during normal high water for boat traffic.
- (3) If the stream to be crossed is a perennial watercourse and has a slope of more than 2%, a bridge span or other open bottom structure~~a pipe arch~~ must be used to maintain the natural streambed.
- (4) Fill sideslopes in a stream or floodplain wetland must be maintained at a slope no shallower than 3 horizontal to 1 vertical and no steeper than 1.5 horizontal to 1 vertical. Fill sideslopes must be stabilized with vegetation, riprap, erosion control mix, or other suitable erosion control material at the completion of the activity.

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NOTE: Uncompacted soils or sandy soils that are saturated at the toe of a slope will be unstable at a 1.5 to 1 slope.

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- (5) Any structure used to cross the stream must span 1.2 times the bankfull width of the stream. For example, a 5 foot wide stream requires a 6 foot wide structure. This requirement does not apply to crossings associated with forest management activities.
- (56) Any structure used to cross the stream~~bridge or culvert~~ must provide an opening with a cross-sectional area at least equal to 3.5 times the cross-sectional area of the

stream channel at bankfull depth or sufficient in size to accommodate 25-year frequency water flows. For crossings associated with forest management activities, the cross-sectional area of the stream is determined based on the normal high water line of the stream.

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NOTE: Stream crossings allowable under this section but located in flood hazard areas (i.e. A zones) as identified on a community's Flood Insurance Rate Maps (FIRM) or Flood Hazard Boundary Maps (FHBM) must be designed and constructed under the stricter standards contained in that community's National Flood Insurance Program (NFIP). For example, a crossing may be required to pass a 100-year flood event.

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- (67) Road surfaces must be constructed in a manner to prevent erosion of material into the river, stream or brook.
- (78) Surface water on or adjacent to crossing approaches must be diverted through vegetative filter areas at least 25 feet long to avoid sedimentation of the watercourse. Roadside ditches may not extend to the resource being crossed.

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NOTE: Surface water on or adjacent to crossing approaches should be diverted through vegetative filter areas to avoid sedimentation of the watercourse. Because roadside ditches may not extend to the resource being crossed, filter areas should be established in accordance with the following tables:

Average slope of land between exposed mineral soil and the normal high water mark (percent)	Width of strip between ditch terminus and normal high water mark (feet along surface of the ground)
0	25
10	45
20	65
30	85
40	105
50	125
60	145
70	165

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- (89) A stream ford must be lined with crushed stone, blasted ledge, washed stone, gabion blankets or geotextile material for erosion control when the natural stream bed does not consist of ledge or rock.
- (910) A stream ford must allow for fish passage at all times of the year and may not impound water. ~~A~~The fords must also allow for maintenance of ~~natural~~normal stream flows.
- (101) ~~Culvert~~Crossings using a culvert or other structure with a bottom must:
- Be limited to 75 feet in length. This limit may not be exceeded within a half-mile length of the stream or within the length of stream controlled by the applicant, if less;



- (b) Follow the alignment and grade of the existing stream channel ~~where possible~~. On perennial streams the structure's ~~culvert's~~ gradient may not exceed 1%;
- (c) Have the bottom of the entire structure ~~culvert~~ installed ~~at or below stream bed elevation, except for additional culverts at the same crossing~~. Except for crossings associated with forest management activities, the structure must be embedded in the stream channel such that it spans 1.2 times the bankfull channel at the bankfull elevation.
- (d) Except for crossings associated with forest management activities, must have corrugations or similar internal roughness to decrease water velocity. Smooth-bore culverts are not allowed to be used in new crossings ~~Where two or more culverts are installed, be offset in order to concentrate low flows into the culvert within the natural channel;~~
- (e) Be seated on firm ground, or on geotextiles, logs or other materials used to stabilize the ground;
- (f) Be covered by soil to a minimum depth of 1 foot or according to the structure ~~culvert~~ manufacturer's specifications, whichever is greater;
- (g) Have the soil compacted at least halfway up the side of the structure ~~culvert~~; and
- (h) Have the inlet and outlet ends stabilized by riprap in accordance with Section 8 Shoreline stabilization standards to avoid erosion of material around the culvert.

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NOTE: For guidance on riprap installation, consult the Maine Erosion and Sediment Control BMPs, dated March 2003. This handbook and other references are available from the DEP.

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- (12) Bottomless structures such as bridges or open arch culverts must be used where the presence of ledge prevents embedding a crossing structure unless the ledge condition is deemed a barrier to fish passage by DIFW and DMR. This requirement does not apply to crossings associated with forest management activities.
- (13) Wheeled or tracked equipment may not operate in the water. Equipment operating on the shore may, where necessary, reach into the water with a bucket or similar extension. Equipment may cross streams on rock, gravel or ledge bottom.
- (14) Work below the normal high water line must be done during periods of low water level or flow.
- (15) Except for crossings associated with forest management activities, anyIf the crossing that involves trenching or disturbance of substrate in a river, stream or brook must occur between July 15October 2 and October 1July 14, the activity must occur during the time period unless otherwise approved by the DIFW and DMREP. The approved time period may be the time period proposed by the applicant or an alternative time period approved by the DIFW and DMREP. An alternative time period will be required where it appears an unreasonable impact on water quality or fisheries may result at the point of crossing or immediately downstream of the

crossing. ~~The applicant will be notified by the DEP within 14 days if an alternative time period, other than the one proposed by the applicant, is required for constructing the crossing.~~

(16) For crossings associated with forest management activities that involve trenching or disturbance of substrate in a river, stream or brook between October 2 and July 14, the activity must occur during the time period approved by the DEP. The applicant will be notified by the DEP within 14 days if an alternative time period, other than the one proposed by the applicant, is required for constructing the crossing. An alternative time period will be required where it appears an unreasonable impact on water quality or fisheries may result at the point of crossing or immediately downstream of the crossing.

~~(147) If work is performed in a river, stream or brook that is less than three feet deep at the time of the activity and at the location of the activity, t~~The applicant must provide for temporary diversion of stream flow to the opposite side of the channel or around the work area while work is in progress.

(a) Diversion may be accomplished by placing sandbags, timbers, sheet steel, concrete blocks, 6+ mil polyethylene or geotextiles in the stream from the bank to midstream on the upstream side of the activity. No more than two thirds (2/3) or 25 feet of stream width, whichever is less, may be diverted at one time.

(b) Any material used to divert water flow must be completely removed upon completion of the activity, and the stream substrate must be restored to its original condition.

(c) A pump may be operated, where necessary, for a temporary diversion. The pump outlet must be located and operated such that erosion or the discharge of sediment to the water is prevented and the water is returned to the stream channel below the work area.

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NOTE: For guidance on temporary stream diversion techniques, consult the Maine Erosion and Sediment Control BMPs, dated March 2003. This handbook and other references are available from the DEP.

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~~(158)~~ All wheeled or tracked equipment that must travel or work in a vegetated wetland area must travel and work on mats or platforms in order to protect wetland vegetation.

~~(169)~~ All excavated material must be stockpiled either outside the wetland or on mats or platforms. Hay bales or silt fence must be used, where necessary, to prevent sedimentation.

~~(1720)~~ The use of untreated lumber is preferred. Lumber pressure treated with chromated copper arsenate (CCA) may be used only if necessary and only if use is allowed under federal law and not prohibited from sale under 38 M.R.S.A. 1682, and provided it is cured on dry land in a way that exposes all surfaces to the air for a

period of at least 21 days prior to construction. Wood treated with creosote or pentachlorophenol may not be used where it will contact water.

D. Definitions. The following terms, as used in this chapter, have the following meanings, unless the context indicates otherwise:

(1) Bankfull width. The width of the bankfull channel at the point the water level, or stream stage, begins to overflow into an active floodplain or bench. Where only one side of a stream contains a floodplain or bench, the width is measured as a straight line from that point horizontally across the stream to the opposite bank. Where no floodplain or bench exists, the width is measured as a straight line between the highest points of the normal high water line on each bank.

(2) Bankfull depth. The depth to the stream sediments measured vertically downward from the line that measures bankfull width.

(43) Cross-sectional area. The cross-sectional area of a stream channel is determined by multiplying the ~~bankfull stream channel~~ width by the average ~~bankfull stream channel~~ depth. ~~The stream channel width is the straight line distance from the normal high water line on one side of the channel to the normal high water line on the opposite side of the channel.~~ The average ~~bankfull stream channel~~ depth is the average of the vertical distances from a straight line drawn to determine bankfull width between the normal high water marks of the stream channel to the bottom of the channel. Depth measurements are taken a minimum of three times and at no more than 1 foot intervals along the line defining bankfull width. One depth measurement must be taken at the deepest part of the channel.

(24) Crossing. Any activity extending from one side to the opposite side of a protected natural resource, or to an island or upland within a protected natural resource whether under, through or over that resource. Such activities include, but are not limited to roads, fords, bridges, culverts, utility lines, water lines, sewer lines and cables, and the clearing and removal of vegetation necessary to install and maintain these crossings.

(35) Fill. a. (verb) To put into or upon, supply to, or allow to enter a water body or wetland any earth, rock, gravel, sand, silt, clay, peat, or debris; b. (noun) Material, other than structures, placed in or adjacent to a water body or wetland.

(46) Ford. A permanent crossing of a stream utilizing an area of existing, non-erodible substrate of the stream, such as ledge or cobble, or by placing non-erodible material such as stone or geotextile on the stream bottom.

(7) Natural stream flow. The amount of water contained within a stream's banks at bankfull stage. Crossing structures that span 1.2 times the bankfull width of a stream are presumed to allow for natural stream flow.

(58) Perennial watercourse. A river, stream or brook depicted as a solid line on the most recent edition of a United States Geological Survey 7.5 minute series topographic map, or if not available, a 15 minute series topographic map.

(69)Riprap. Heavy, irregularly-shaped rocks that are fit into place, without mortar, on a slope. Square or rectangular rocks with flat faces, such as quarry stone or manufactured blocks, do not qualify as “irregularly-shaped”.

(710)Used for navigation. Those rivers, streams or brooks used by motorized watercraft.

(11)Water courses containing fish. Any river, stream or brook as defined by the Natural Resources Protection Act, 38 M.R.S.A. §480-B(9), whether perennial or intermittent. Unless available data indicates otherwise, all rivers, streams and brooks are considered water courses containing fish.